luculentius? Quis clarius illustravit raram sollertiam qua minuta animalium genera, vel ut compares alliciant vel ut infestas hostium incursiones arceant, nunc colores mutare, nunc novum aliquod simulacrum assumere, nunc etiam sexum mentiri videantur? Quae quidem omnia si primo visu parvi momenti esse habeantur, eadem, nisi magnopere fallor, oculis subjecta fidelibus et summa accuratione tractata, immane quantum prosunt ad intimas vitae leges enodandas. Quae cum ita sint, haud dubitarem eruditissimi auctoris C. Plinii Secundi verba citare de insectorum corporibus scribentis: "In his tam parvis atque tam nullis quanta vis, quae ratio, quam inextricabilis perfectio! . . . Sed turrigeros elephantorum miramur humeros, taurorumque colla et truces in sublime jactus, tigrium rapinas, leonum jubas, cum rerum natura nusquam magis quam in minimis tota sit; et in contemplatione naturae nihil possit videri supervacuum."

Praesento vobis ornatum et excultum virum Ronaldum Trimen, qui et ipse "Naturalis Historiae Libris" tam laudabile incrementum addidit, ut admittatur ad gradum Magistri in facultate Artium, honoris causa.

CAMBRIDGE.—Mr. W. Chawner, Master of Emmanuel College, is to be Vice-Chancellor during the ensuing academical year.

Mr. R. C. Punnett, of Caius College, has been nominated to occupy the University table at the Marine Biological Laboratory at Plymouth.

The Chemical, Pathological, and Anatomical Laboratories will be open during the ensuing Long Vacation, and a number of special courses of instruction will be given in July and August.

The electors to the new chair of Agriculture are the Right Hon. W. H. Long, Mr. A. E. Shipley, Dr. D. MacAlister, Prof. Liveing, Sir J. H. Gilbert, Prof. Foster, Prof. Marshall Ward, and Sir Walter Gilbey.

IT is satisfactory to know that the value of scientific education and research in agriculture is becoming more and more recognised by foremost agriculturists. Mr. Boyd-Kinnear refers to these matters in a contribution to the *Morning Post*, and to the lack of interest taken in them by British farmers. He points out that a knowledge of the scientific principles of agriculture is of fundamental importance, and that what should be taught in our schools are the sciences on which farming rests—physics, chemistry, mechanics, and the physiology of plants and animals. The sound remark is made that for a farmer to work without this kind of knowledge, is much the same as if a doctor were educated by being shown cases in a hospital before he had learned anything of anatomy or the nature of drugs. In order to know agriculture, it is necessary to understand first of all the elements and the action of the soil and the air, and the operations of life. But all that the most learned in science know of these things is infinitely small compared with the amount that is yet unknown. There is, therefore, urgent need, not only for teaching what is known, but also for learning more. That is, we ought to have both schools where the fundamental sciences which agriculture involves are taught, and also institutions for further research into the secrets yet undiscovered.

Referring to agricultural research stations, Mr. Boyd-Kinnear remarks:—In all countries but England these are provided and liberally maintained by the State. In Germany there are, and have been for the last half-century, no fewer than sixty-seven agricultural teaching and research stations. France has fifty-three, Austria thirty-five, and even Russia has fourteen. The other European States, including countries which we call so backward as Spain and Portugal, have sixty-one among them. The United States have fifty-four, these being supported by the individual States; Canada has several, while Brazil, Japan, and Java have each one! England has—none! none, that is, with State endowment. During the last few years, the County Councils of Sussex, Yorkshire, Bucks, and Durham have established teaching colleges, but without any adequate provision for research. There are also the privately-conducted colleges of Cirencester, Downton, and one or two others, while the half-century of inquiries conducted by Sir John Lawes is deserving of grateful acknowledgment. But isolated and private effort is wholly inadequate to meet the want, or even to direct public attention to it.

SOCIETIES AND ACADEMIES.

LONDON.

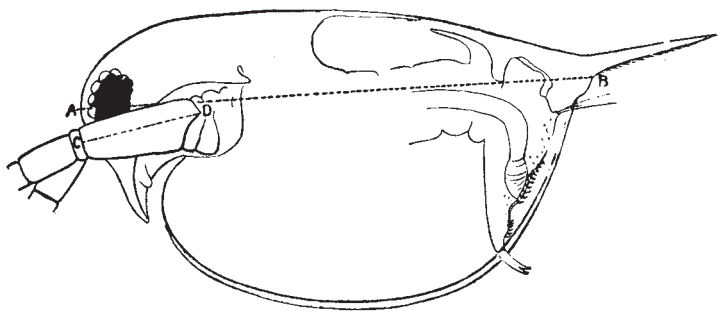
Royal Society, May 4.—"An Observation on Inheritance in Parthenogenesis." By Ernest Warren, D.Sc., University College, London. Communicated by W. F. R. Weldon, F.R.S.

If the hypotheses of Weismann on heredity and variation be founded on fact, then it should follow that offspring produced by parthenogenesis should exhibit little or no departure from their parthenogenetic mother.

It appeared an easy investigation to test this supposition by direct measurement. For this purpose, *Daphnia magna* (Straus) was chosen.

On twenty-three Daphnia, the following measurements were made: (1) the length of the protopodite of the second antenna of the right side (C D see Fig.), and (2) the total length of the body (A B). The first dimension was expressed in thousandths of the second, because these animals (like very many invertebrates) continue to grow throughout life. The broods, amounting in all to ninety-six young, produced by the twenty-three mothers (themselves originating by parthenogenesis), were similarly measured.

The children of the same parthenogenetic family were now seen to vary considerably. A correlation table between the mothers and offspring was prepared, and from it the coefficient of correlation was found to be ·466. The standard deviation (S.D.) of an array of offspring was 5·22 thousandths of the body length: if we express it as a kind of coefficient of variation we have $\frac{\text{S.D. of array}}{\text{Mean of all the offspring}} \times 100 = 3{\cdot}06$.



Thus *in parthenogenesis there is very considerable variability among the offspring*, but whether there is less or more than in sexual reproduction the present measurements do not show.

Dr. Galton and Prof. Pearson have shown that in Basset hounds, stature in man, &c., the correlation between father or mother and offspring approaches the theoretical value ·3, while between mid-parent and offspring it approaches ·424, and the coefficient of regression of offspring on mid-parent is about ·6.

Here, in the Daphnia, the coefficients of correlation and regression were respectively ·466 ± ·054 and ·619 ± ·081. Thus it would *seem* as though in the matter of inheritance a parthenogenetic mother acts as a mid-parent. The subject, however, requires much further elucidation, and the hypothesis is about to be tested on another parthenogenetic animal.

Geological Society, May 24.—W. Whitaker, F.R.S., President, in the chair.—The President called attention to the issue of vol. iii. of Hutton's "Theory of the Earth," and said that the thanks of the Fellows were due to Sir A. Geikie for having edited and annotated most carefully this work. The volume was printed from a previously unpublished manuscript which had been for many years in the possession of the Society: its contents were extremely interesting, and it supplemented the previous volumes by the inclusion of an index to the whole of the work, prepared by Sir A. Geikie.—Prof. Seeley exhibited a cast from a footprint obtained by Mr. H. C. Beasley from the Trias at Stourton. The impression is about 1½ inch long, and nearly as wide. The cast has been treated by oblique illumination, so as to display its osteological structure by means of the shadows thus thrown. All the claws are directed outwards, as in a burrowing animal. The form of the foot

resembles that of a monotreme mammal rather than that of any existing reptile. There appears to be a slender pre-pollex including three bones. The only other example of this structure in the Trias is in the Theriodont reptile *Theriodesmus*, in which it is less definite. This character may add to the interest of other footprints from Stourton, which in the form of the foot approximate to Anomodont reptiles from the Karoo Beds of Cape Colony.—On the distal end of a mammalian humerus from Tonbridge, by Prof. H. G. Seeley, F.R.S. The bone described in this communication was found in 1898 by Mr. Anderson on the bank of the river Medway, near Tonbridge. It was seen projecting from reconstructed rock which contained fragments of flints among other materials. Traces of matrix at the distal end show that the specimen has been derived from quartz-sand bound together with limonite, such as might occur in the Hastings Sand, Wealden Clay, or Lower Greensand. Conditions of mineral structure and osteological character incline the author to believe that the bone was originally contained in the Wealden Clay. The fossil is 4 inches long, and indicates a humerus which may have been 6 inches in length when perfect, as large as that of a wolf but smaller than that of a bloodhound. The form of the shaft precludes any comparison with the carnivora, and indicates a resemblance to ungulate types. When the bone is held vertically and seen from the front, the condyles are oblique—a character not observed in any other animal. The weight of evidence appears to incline towards reference of the fossil to the Artiodactyla, but it probably indicates a new family type.—On evidence of a bird from the Wealden Beds of Ansty Lane, near Cuckfield, by Prof. H. G. Seeley, F.R.S. A fragment of bone found, by Mr. Neville Jones, a member of the London Geological Field Class, embedded in sandstone was identified by the author as probably the distal end of the femur of a bird. The external condyle is not only larger and deeper than the inner, but is more prolonged distally—perhaps the most distinctive avian character of the bone. *Colymbus* is the only existing bird to which the fossil makes any approximation, but the resemblance is distant and not suggestive of near affinity, and it is interesting that the cretaceous birds show so marked an affinity with that type. The resemblances of the dinosaurian and crocodilian femora with this type are such that almost every individual feature of the bone can be paralleled in some fossil referable to these groups, but there are no British dinosaurs of so small a size or possessing some of the marked features shown by this bone.—Notes on the rhyolites of the Hauraki Goldfields (New Zealand), by James Park and Frank Rutley; with analyses by Philip Holland. Part i. of this paper, by Mr. J. Park, gives a description of the rhyolites as seen in the field. After a rest from volcanic action during the secondary period, the tertiary eruptions burst forth and were more widespread than those of recent times. In the Hauraki Peninsula, the basement palæozoic rocks are covered by richly fossiliferous marly clays and limestone of Lower Eocene age, and these by a vast accumulation of andesitic lavas and tuffs, in places 3000 feet thick. These andesites are the gold-bearing rocks of the district, and they are succeeded by rhyolitic lavas and ashes. Both andesites and rhyolites were influenced by solfataric action, resulting in siliceous deposits rich in gold and silver. The rhyolites rest on rocks probably of Upper Miocene age, and are followed by Pleistocene and recent deposits; so that they probably range from older to newer Pliocene in date. Part ii. contains the observations of Mr. Rutley on the petrology of the rhyolites. The rocks present occasional occurrences of perlicity, and the lithoidal types sometimes owe their characters to subsequent devitrification, sometimes to the effect of cooling on, or immediately after, eruption. Reheating has at times reduced the felspars to the condition of felspar-glass. Although plagioclase-felspar is common, the analyses indicate that the series must be retained with the rhyolites, it being quite possible that some of these minerals may have been derived from the andesites.—On the progressive metamorphism of some Dalradian sediments in the region of Loch Awe, by J. B. Hill, R.N. (communicated by Sir A. Geikie, F.R.S.). The region under discussion contains two principal series of rocks, passing one into another without a break, and conveniently referred to the Dalradian System: (1) The Ardrishaig Series (phyllites and fine-grained quartzites). (2) The Loch Awe Series (black slates, limestones, grits, and quartzites). The latter series lies in a gentle trough of the former. Even in their most altered state, the clastic nature of the rocks of the Loch Awe Series is apparent. Both series are pierced by innumerable intrusive sills of epidiorite, hornblende schist, and chlorite-schist, modified diorites and gabbros, which effect contact-metamorphism in the bordering sediments. Intrusive rocks of post-schistose date also occur, like the Glenfyn granite, the granite of Ben Cruachan, and smaller masses of granite, monzonite, hyperite, ultrabasic rocks, quartz-porphyries, felspar-porphyries, porphyrites, and lamprophyres; these are in their turn cut by dolerite and basalt-dykes. All these rocks exhibit progressive metamorphism when traced towards the north-east and towards the Central Highlands, a character best seen in the loop formed by the rocks near the head of Loch Awe. Although the author does not go very fully into the question of the causes of the progressive metamorphism exhibited in tracing these rocks towards and into the Central Highland schists, he had reason to suspect that "the intense regional type of metamorphism was linked with the same phenomena that afterwards resulted in the irruption of the granite-masses."

PARIS.

Academy of Sciences, May 29.—M. van Tieghem in the chair.—On isothermal surfaces, by M. Gaston Darboux.—On the laws of pressures in guns, by M. Vallier. A theoretical discussion of the distribution of pressure from point to point of the barrel during firing.—On cyclic pencils which contain a system of geodesics, by M. C. Guichard.—On the series of Dirichlet, by M. Lerch.—On the true polarisation of dielectrics placed within an electric field, by M. H. Pellat. The hypothesis is advanced that polarisation is not instantaneous; but that a dielectric, solid or liquid, placed suddenly in an electric field, takes a polarisation which increases with the time, reaching a maximum asymptotically. If the field ceases, the polarisation decreases gradually, becoming zero at the end of a certain time, theoretically infinite. The results of an experimental study are in agreement with this hypothesis.—Polymerisation of abnormal vapours: nitrogen peroxide and acetic acid, by M. A. Leduc. In a previous paper, the author has shown that the variations in the density of chlorine with temperature are in perfect agreement with the theory of corresponding states, and the assumption that a dissociation of chlorine molecules has taken place is unnecessary. An application of the same method to the cases of nitrogen peroxide and acetic acid shows that the molecule is clearly dissociated.—On the measurements, in terms of a wave-length as unit, of a quartz cube, of 4 cm. length of side, by MM. Ch. Fabry, J. Macé de Lépinay, and A. Perot. The measurement was effected by means of the interferential method previously described, the variations between the individual readings being of the order of 1 in 1,000,000.—Bravais points and poles, by M. Pierre Lefebvre.—On the estimation of hydrogen phosphide in gaseous mixtures, by M. A. Joannis. A solution of copper sulphate cannot be employed to estimate hydrogen phosphide in gaseous mixtures, except in the absence of gases absorbable by copper salts. The copper sulphate solution must always be employed in considerable excess.—Separation and estimation of traces of chlorine in presence of a very large excess of bromide, by M. H. Baubigny. The method of copper sulphate and potassium permanganate is employed, and analyses of samples of potassium bromide sold as pure showed that a trace of chlorine was invariably present, 0·1 per cent. of chlorine being the minimum.—Properties of some mixed haloid salts of lead, by M. V. Thomas.—On the quantitative separation of cerium, by MM. G. Wyrouboff and A. Verneuil. The method suggested is based upon the solution of the mixture of oxides in nitric acid, and subsequent polymerisation of the oxide in presence of sulphuric acid. The test analyses given are very satisfactory.—The enantiomorphic structure of *l*- and *r*-benzylidene-camphors as revealed by corrosion figures, by M. Minguin.—Mixed combinations of phenylhydrazine and another organic base with certain metallic salts, by M. J. Moitessier.—Study of some oxymethylenic derivatives of cyanacetic ethers, by M. E. Grégoire de Bollemont.—Centrosome and fecundation, by M. Félix Le Dantec.—On the variations and specific grouping of the American Peripatæ, by M. E. L. Bouvier.—Spontaneous asphyxia and the production of alcohol in the deeper tissues of ligneous stems under natural conditions, by M. Henri Devaux. A study of the respiratory coefficients of the internal layers of certain plant stems showed that the ratio CO_2/O_2 increases rapidly with the temperature. This increase of carbon dioxide, according to the

author, can only arise from a true fermentation, and in accordance with this view alcohol was obtained from such stems.—The guidroa, the caoutchouc tree of Madagascar, by M. Henri Jumelle. An examination of the guidroa showed that it clearly belongs to the genus *Mascarenhasia*; but, as it does not exactly agree with any of the fifteen or sixteen species actually known, the name *M. velutina* is proposed for the plant.—On the parasitism of *Ximenia americana*, by M. Edouard Heckel.—On some rhyolites from Somaliland, by M. A. Lacroix.—On the eruptive rocks of Cape Blanc (Algeria), by MM. L. Duparc and E. Ritter. Microscopic and chemical examination of the volcanic rocks of Cape Blanc show them to be neo-volcanic quartz-porphyry of a basic character.—On the existence in the blood of animals of a substance preventing the coagulation of milk, by M. A. Briot. Blood serum from the horse contains a substance capable of neutralising the effects of a certain quantity of rennet. This substance is of a diastatic nature, since it cannot be dialysed, is destroyed by heat, and can be precipitated by ammonium sulphate and by alcohol.

DIARY OF SOCIETIES.

THURSDAY, JUNE 8.

ROYAL SOCIETY, at 4.30.—Meeting for Discussion.—*Subject*: On Preventive Inoculation: introduced by M. Haffkine.

MATHEMATICAL SOCIETY, at 8.—On Solitary Waves, Equivoluminal and Irrotational, in an Elastic Solid: Lord Kelvin, G.C.V.O.—On Several Classes of Simple Groups: Dr. G. A. Miller.—The Transmission of Stress across a Plane of Discontinuity in an Isotropic Elastic Solid and the Potential Solutions for a Plane Boundary: Prof. J. H. Michell.—On Theta Differential Equations and Expansions: Rev. M. M. U. Wilkinson.—Finite Current Sheets: J. H. Jeans.—On a Congruence Theorem having reference to an Extensive Class of Coefficients; and on a Set of Coefficients analogous to the Eulerian Numbers: Dr. Glaisher, F.R.S.—(1) The Reduction of a Linear Substitution to its Canonical Form; (2) On the Integration of Systems of Total Differential Equations: Prof. A. C. Dixon.

FRIDAY, JUNE 9.

ROYAL ASTRONOMICAL SOCIETY, at 8.—Further Investigation concerning the Position Error affecting Eye-Estimates of Star Magnitudes: A. W. Roberts.—Equatorial Comparisons of Jupiter, Uranus and Neptune with certain Stars in Newcomb's Standard Catalogue: John Tebbutt.—Note on the Nebula N.G.C. 6535: W. H. Robinson.—*Probable Paper*: An Ephemeris of Two Situations in the Leonid Stream: G. Johnstone Stoney.

PHYSICAL SOCIETY, at 5.—On the Distribution of Magnetic Induction in a Long Iron Bar: C. G. Lamb.—On the Absolute Value of the Freezing-Point: J. Rose-Innes.

MALACOLOGICAL SOCIETY, at 8.—Description of a New Species of *Unio* from the River Pahang: E. A. Smith.—Notes on Holocene Deposit at the Horseshoe Pit, Colley Hill, Reigate: Rev. R. Ashington Bullen.—Anatomical Notes on *Medyla insculpta*, Pfr.: Henry Suter.

SATURDAY, JUNE 10.

GEOLOGISTS' ASSOCIATION.—Excursion to Rickmansworth and Harefield. Directors: W. Whitaker and John Hopkinson.

MONDAY, JUNE 12.

RÖNTGEN SOCIETY, at 8.—Portable Röntgen Apparatus, for Field and Ward Work, to be demonstrated and described by Major Beevor, J. Hall Edwards, and H. W. Cox.—A New Stereoscope to be demonstrated for Mr. Gregory by F. W. Watson Baker.—Dr. Walsh will also show a New Stereoscope.

TUESDAY, JUNE 13.

ANTHROPOLOGICAL INSTITUTE, at 8.30.—Prehistoric Man in the Neighbourhood of the Kent and Surrey Border: Neolithic Age: George Clinch.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—Acetylene: Prof. Vivian B. Lewes.

THURSDAY, JUNE 15.

ROYAL SOCIETY, at 4.—Prof. A. Michelson will read a Paper.—The Colour Sensations in Terms of Luminosity: Captain Abney, F.R.S.—A Comparison of Platinum and Gas Thermometers at the International Bureau of Weights and Measures at Sèvres: Dr. J. A. Harker and Dr. P. Chappuis.—On a Quartz-Thread Gravity Balance: R. Threlfall, F.R.S.—On the Orientation of Greek Temples, being the Results of some Observations taken in Greece and Sicily, in May, 1898: F. C. Penrose, F.R.S.—A Preliminary Note on the Life-History of the Organism found in the Tsetze Fly Disease: Dr. H. G. Plimmer and Dr. T. Rose Bradford, F.R.S.—And other Papers.

LINNEAN SOCIETY, at 8.—Contributions to the Natural History of Lake Urmi and its Neighbourhood: R. T. Günther.—A Systematic Revision of the Genus Najas: Dr. A. B. Rendle.—On the Anatomy and Systematic Position of some Recent Additions to the British Museum Collection of Slugs: Walter E. Collinge.—The Edwardsia Stage of Lebrunia, and the Formation of the Œsophagus and Gastro-cœlomic Cavity: J. E. Duerden.

CHEMICAL SOCIETY, at 8.—Ballot for the Election of Fellows.—On the Decomposition of Chlorates, with special reference to the Evolution of Chlorine and Oxygen: W. H. Sodeau.—The Action of Hydrogen Peroxide on Formaldehyde: Dr. A. Harden.—Homocamphoronic and Camphononic Acids: A. Lapworth and E. M. Chapman.—Action of Silver Compounds on α-Dibromocamphor: A. Lapworth.—The Colouring Matter of Cotton Flowers: A. G. Perkin.—Experiments on the Synthesis of Camphoric Acid: H. A. Auden, W. H. Perkin, jun., and J. L. Rose.—Methylisoamylsuccinic Acid, Part I.: W. T. Lawrence.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—The Hereford Earthquake of December 17, 1896: Dr. C. Davison (Birmingham, Cornish).—Physikalisches Praktikum: E. Wiedemann u. H. Ebert, Vierte Auflage (Braunschweig, Vieweg).—Tables for Quantitative Metallurgical Analysis: J. J. Morgan (Griffin).—Royal University of Ireland Exam. Papers, 1898 (Dublin).—Year-Book of Photography (9 Cecil Court).—A Country Schoolmaster: James Shaw, edited by Prof. R. Wallace (Edinburgh, Oliver).—I Batteri Patogeni: Dr. N. Ottolenghi (Torino, Rosenberg).—Sieroterapia e Vaccinazioni Preventive contro la Peste Bubbonica: Dr. A. Lustig (Torino, Rosenberg).—The Elements of Practical Astronomy: W. W. Campbell, 2nd edition (Macmillan).—Bergens Museum. Report on Norwegian Marine Investigations, 1895–97: Hjort, Nordgaard, and Grann (Bergen).—List of the Genera and Species of Blastoidea in the British Museum (Natural History) (London).—Chimie Végétale et Agricole: Prof. Berthelot, 4 Vols. (Paris, Masson).—Sewer Design: H. N. Ogden (Chapman).—The Steam Engine and Gas and Oil Engines: Prof. J. Perry (Macmillan).—The Dog: edited by Piepe and Furneaux (Philip).—An Account of the Deep-Sea Ophiuroidea collected by the R.I.M.S. Ship *Investigator*: R. Koehler (Calcutta).—Traité Élementaire de Mécanique Chimique: Prof. P. Duhem, Tome iv. (Paris, Hermann).—U.S. Geological Survey, 18th Annual Report, Part 2, Part 5 (Washington).

PAMPHLETS.—Die Methode der Variationsstatistik: G. Duncker (Leipzig, Engelmann).—Das Hypsometer als Luftdurckmesser, &c.: H. Mohn (Christiania, Dybwad).—Summary Report of the Geological Survey Department, 1898 (Ottawa).—Mauritius Magnetical Reductions: T. F. Claxton (Mauritius).—Protokoll über die vom 31 März bis 4 April, 1898 zu Strassburg i.E. abjgehaltene erste versammlung der Internationalen Aëronautischen Commission (Strassburg).—Picture Taking and Picture Making (Kodak Press).—Natural History of the Musical Bow: H. Balfour, Primitive Types (Oxford, Clarendon Press).—Thatsachen und Auslegungen in Bezug auf Regeneration: A. Weissmann (Jena, Fischer).—La Navigation a Vapeur sur le Haut Yang-Tse: R. P. S. Chevalier (Chang-Hai).

SERIALS.—Journal of the College of Science. Imperial University of Tokyo, Japan, Vol. xi. Part 2 (Tokyo).—Proceedings of the Washington Academy of Sciences, Vol. i. pp. 15–106 (Washington).—Johns Hopkins University, Studies in Historical and Political Science, Series xvii. Nos. 4 and 5 (Baltimore).—Monthly Weather Review, February (Washington).—Boletim do Musen Paraense, December (Pará).—Società Reale di Napoli, Atti della Reale Accademia delle Scienze Fisiche e Matematiche, serie ii. Vol. ix. (Napoli).—Contemporary Review, June (Isbister).—Century Magazine, June (Macmillan).—Humanitarian, June (Duckworth).—Photogram, June (Dawbarn).—Knowledge, June (Witherby).—Journal of the Chemical Society, June (Gurney).—Journal of the Marine Biological Association, June (Dulau).—Middlesex Hospital Journal, May (London).—Zeitschrift für Physikalische Chemie, xxix. Band, 1 Heft (Leipzig).—Journal of Botany, June (West).—Madras Government Museum, Bulletin Vol. 2, No. 3 (Madras).—An Illustrated Manual of British Birds: H. Saunders, 2nd edition, Parts 16 to 20 (Gurney.)—Fortnightly Review, June (Chapman).—Scribner's Magazine, June (Low).—Anglo-American Magazine, June (Anglo-American Publishing Company).

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